

An Alternative Vision for the Sacramento-San Joaquin Delta

By Peer Swan

July 20, 2007

Described below is a new vision for the Delta that builds upon many of the existing beneficial attributes of the Delta system to provide a long term solution designed to:

- Protect and improve the quality and reliability of the State's primary source of water;
- Promote and improve the economy of the region and the State;
- Provide extensive recreational opportunities;
- Reduce and mitigate flood risk within the critical areas of the Delta;
- Protect the primary roads, ship channels, rail lines and water conveyance; and
- Restore much of the historic Delta ecology by creating conditions that allow the re-establishment of significant tidal marsh, emergent wetland and riparian woodland habitat while providing for an ecosystem that has a naturally fluctuating water quality.

Although there is no absolute protection against the forces of nature, this vision is designed to significantly reduce the risks of loss due to subsidence, rising sea levels, flooding, and seismic activity. The goal of this vision is to produce a different Delta: one that allows for naturally fluctuating and varied levels of salinity that are characteristic of the interface of healthy tidal marsh and emergent wetland areas, while simultaneously providing more reliable water supplies by eliminating the need to provide an artificial fresh water environment to sustain exports.

Summary

This vision is designed to utilize the strongest assets and beneficial attributes of the Delta system by augmenting and building new "protected" corridors to provide sustainable water conveyance, transportation and utility service system. In addition, the proposal provides a mechanism to acquire existing land in the west and central Delta, limit the number of levees that need to be maintained by the State, limit future State liability caused by levee failure in the west and central Delta, invigorate a vibrant economy based upon a healthy ecosystem, provide for an orderly phase-out of farming in the west and central Delta, reverse subsidence on certain islands along the Sacramento River, and re-establish critical habitats. The concept is to consolidate infrastructure and urban uses in specific areas and corridors in the Delta, which will in-turn provide the opportunity to return as much as the Delta as is feasible to more natural condition. Restoration of the natural ecological attributes of the Delta combined with the creation of enhanced economic "nodes" would maintain or potentially boost the tax revenue to the various counties and to the State.

Water Supply Element

Among the strongest and best maintained levees with in the Delta are those along the Sacramento River and the Sacramento Ship Channel. It is proposed that the Ship Channel be used as the main stem of a water conveyance facility and pumping forebay for exportable

supplies. High quality water from the Sacramento River diverted just below the American River would be delivered down the Ship Channel to a set of pumps located next to Rio Vista. These pumps would be connected to and convey water through a series of newly constructed network of water conveyance tunnels, siphons and pipelines to the California Aqueduct above the Banks Pumping Station (see Exhibit "A"). Water from the new pump station and conveyance system could also be pumped to the North Bay Aqueduct, the Contra Costa water supply system, into East Bay MUD's Mokelumne Aqueduct, and the Federal Water Project canal above the Tracy pumping station through a series of interties. In each case the quality and reliability of the water being delivered this system would be significantly improved.

The water conveyance project would consist of the following elements:

- Opening the Ship Channel fully to the Sacramento River and constructing fish screens at the diversion point, constructing a gate at the end of the Ship Channel to protect water quality and prevent reverse flows while allowing ship access to the Port of Sacramento;
- Constructing a flood protected pump station on the Rio Vista side of the Delta connected to the Ship Channel by siphons,
- Constructing pipelines around Rio Vista to a point opposite Sherman Island (just beyond the major power line crossing),
- Constructing tunnels below the peat layer under Sherman and Jersey Islands that connect to a pipeline to the California Aqueduct to above the Banks Pumping Station;
- Constructing connecting pipeline and flow control facilities to the other water supply export projects; and
- If needed, a pipeline could be constructed from the new water conveyance system across the proposed Highway 4 protected corridor (see below) to areas along the eastern fringe of the Delta (Stockton/Lodi).

The water conveyance system project can be built in phases, but when fully constructed would remove all export pumping from the Delta except under extremely wet conditions. In addition, since the intake would be above the Sacramento secondary effluent discharge and not subject to Delta drainage or Stockton discharges, water quality would be substantially improved. The pipeline and tunnel (below the peat layer) would be considerably less vulnerable to earthquake failure and as the tunnel portion would be partially located under the new Sherman Island Transportation/Utility Corridor, and therefore, it would be easier to repair in the event of a failure. The water conveyance project would also be insulated from flood damage since it would be within heavily protected and isolated channels (Ship Channel) or in tunnels or protected pipelines. Tunnels under the peat layer should minimize the risk of subsidence failure and pipelines would be designed with structural support tied to competent foundational material in questionable areas, as needed. The intake point (Sacramento Ship Channel in Sacramento) would be far enough upstream to protect from large increases in the level of the Pacific as a result of climate change. The remaining flow of the Sacramento River would keep the salt water gradient well below this new intake.

Once completed the water supply for all but in-Delta uses would be isolated from the Delta, thereby allowing full opportunity to change the aquatic ecosystem in the Delta from an artificial fresh water “lake” environment to a more natural condition, without putting the primary water supply of the State and the State’s economy at risk.

Consideration might also be given to preserving and better protecting the current central Delta water delivery system from the Delta Cross Channel to the Federal Pumps at Tracy. These facilities would be operated in deference to environmental and regulatory requirements, and therefore would only provide sporadic, lower quality, and less reliable water supplies. However, an added benefit of maintaining the Tracy pumping facilities would be to have additional capacity to export supplies for storage south of the Delta in extremely wet years under “excess water” conditions.

Land Use – West and Central Delta

The State would offer to purchase all the land in the west and central portions of the Delta from the current landowners for the market value of the land under its present use. Those landowners that do not accept the State’s offer to purchase would be then be fully responsible to flood protect and maintain their land and the State would be absolved of any further responsibility to provide protection or to repair any damage.¹ Groups of owners wishing to provide their own flood protection would also have the option to use existing or form new flood maintenance assessment districts to the extent that no State General Fund or tax revenue was provided to the districts for maintenance and/or flood protection purposes.

The land would be acquired using the proceeds of a State issued General Obligation bonds. The premise for the State’s acquisition of the land is that over time it would be less costly to acquire much of the land than to continue to provide on-going flood protection and maintenance, and that acquisition of the land and conversion over time of the majority of the property to environmental uses would provide a substantial public benefit. To help offset costs to acquire the land and pay debt service, portion of the acquired lands could be leased back on an interim basis to agricultural users. Once leases expired, or if the land became subject to flooding, it would be converted to environmental uses.

Other relatively small and strategically located portions of the acquired land would be put to developed uses (as described below) to provide additional revenues to the State to offset land acquisition costs and to provide enhanced economic “nodes” and recreational opportunities.

Once ownership is achieved the State should use its best efforts to reduce the number of levees by consolidating islands and where appropriate, realigning and revegetating water channels in non-linear alignments to create riverine restoration corridors. During this effort certain channels

¹ It should be noted that most of this land was originally acquired under the terms of the Arkansas Act. Land was provided at no cost if the acquirer drained and reclaimed the land and by inference, provided maintenance. As such, reverting to an owner-maintained strategy is not inconsistent with the original terms of acquisition.

will be widened and their levees reinforced. Best efforts will be used to maintain access to existing minor marina areas until such time as these uses can be relocated, as described below.

Economically Enhanced Land Use Nodes and Protected Population Areas

A relatively small and strategically located portion of the acquired lands within the Delta (typically those with higher elevations, better soil conditions and proximity to existing and proposed transportation and utility services) would be set aside and offered to the private sector by auction for development (see Exhibit "B"). During the acquisition process, the State would work with local land use jurisdictions to pre-zone these areas for tourist/recreation/marina uses. Acquisition by developers and entitlement approvals for these areas would require (by State deed restriction) that the property be developed in such a manner as to protect from rising sea levels, floods, and seismic activity. As noted, proceeds from the auction will be used by the State to offset the expenses of obtaining the land and preparing it for disposition. In addition, the combination of property taxes generated from higher assessed valuations, State income taxes and sales tax revenues from the economic development areas will be used to offset losses of State and local government revenue from former agricultural uses.

Isleton, Terminous and areas adjacent to Walnut Creek would receive substantial flood protection and levee improvements to protect developed population centers, thereby directing flood protection resources to priority areas. Isleton would remain connected to the relocated Highway 12 and Terminous would be at the end of old Highway 12. New economic development centers would be created to accommodate second homes, tourist getaways and housing for residents. Access to the economic development areas located on islands would be by a ferry service or when possible with connecting roads. A float plane service would be encouraged to further connect the areas and to promote tourism.

Major Transportation

Highways 180 and 12 would be relocated (as shown on Exhibit "C") to a reinforced and protected corridor bisecting Sherman Island then traversing to a Sacramento Levee corridor utilizing the reinforced levee to a point opposite Rio Vista. Highway 12 would then continue along the eastern reinforced levee of the Sacramento River around Isleton and then across to connect with Interstate Highway 5. The alignment would follow Thornton Road to the existing intersection with Interstate Highway 5. The corridor across Sherman Island would be designed to be wide enough to carry a four lane divided highway, electrical transmission lines, relocated gas lines, and the proposed water conveyance tunnel. This Sherman Island Corridor will be protected on the Western side by an enclosed and stabilized dredged material disposal area which will act to protect the corridor from erosive wind fetch while at the same time providing an acceptable disposal site for dredged sediment spoils. Additional dredged material areas will also be created in strategic areas (see Exhibit "D").

Highway 12, the Santa Fe Railroad corridor, a double track right-of-way for a potential rail rapid transit system to connect Sacramento/Stockton to the Bay area, and the three barrels of the

Mokelumne Aqueduct would be placed together on a reinforced, flood protected corridor across the southern Delta. Economically Enhanced land use node islands would be created and flood protected in locations adjacent to transportation corridors on areas of higher and better underlying soils. As previously noted, these Economically Enhanced land use nodes would be developed as tourist/recreation/marina uses catering to people wanting to enjoy the beauty of the Delta.

Natural Gas Storage and Transportation/Other Utilities

Natural gas storage has been utilized under the Gulf of Mexico and under other water bodies for many years. Current facilities located in the Delta would have to be modified by the current owners to protect them from the eventual submergence. Natural gas transportation pipelines, as well as electrical transmission facilities would be incorporated into the new protected corridors to the maximum extent possible. Remaining gas, electric and other utilities not subject to relocation within protected corridors would have to be protected from the eventual flooding by the current owners. If deemed necessary, the State could authorize industrial revenue bonds or provide State income tax credits to help finance a portion of these costs.

Agriculture

Agriculture in the central and eastern Delta would continue much as it does today on land not sold to the State (see above). In fact, the majority of prime farm land in the central and eastern Delta would be maintained in its current land uses. A portion of other lands acquired by the State would be leased for agricultural uses leased until such time as these areas were subject to flooding, or converted by the State to environmental uses. Revenue from leased land would offset a portion to the cost to acquire the land and would provide employment until the economy of these areas could be transitioned. There may also be opportunity for aquaculture within portions of the Delta.

Environmental Restoration of Islands along the Sacramento River

Portions of Sherman, Twitchell, Andrus and Tyler Islands (see Exhibit "D") will be targeted for acquisition by the State with the goal of returning these islands or portions thereof to a series of contiguous environmental restoration areas.

The goals of the ecosystem restoration effort on the islands would be to:

- Restore a substantial portion of the Delta ecology by creating conditions that allow the re-establishment of significant tidal marsh, wetland, riparian woodland and riverine habitats;
- Provide for a wetland ecosystem that has naturally fluctuating water quality;
- Facilitate the re-establishment of the anadromous fish species and species of concern by providing a key habitat restoration area that is completely isolated from the Delta export pumps;

- Provide areas for resident bird species as well as migrant species such as waterfowl using the Pacific Flyway during the winter;
- Provide an interconnected, contiguous restoration area that allows movement and prevents isolation of fish, wildlife and plant species; and
- Provide deep water areas in appropriate locations for recreational access by fishermen and boaters.

Initially, gate structures and flood channels would be constructed between the wetland restoration areas and the Sacramento River in such a manner that they can be partially or fully flooded during periods of high river flow. In addition, prior to initial flooding clean dredged or fill material would be placed on the inside of the levees adjacent to the gate structures. Once the gates were initially opened and in subsequent wet seasons, sand and silt carried by the high flows would accumulate in the lower areas of the islands and seal the peat from further oxidation and loss. This periodic flooding and resulting sand and silt accumulation and deposition would reverse the subsidence and over a period of time rebuild the level of these key islands to a state close to their condition prior to their drainage and reclamation. The islands would be strategically flooded in such a manner as to carefully control the incursion of saline water further into the Delta system.

During the island restoration process, efforts would be made re-create tidal marsh, shallow water emergent wetlands, and adjacent riparian woodland areas on portions of the re-graded levees. Interconnected flood channels would be aligned and restored as shaded riverine areas. Emergent wetland species would be allowed to establish on the inside of the levees and in areas of accumulated sediment. Over time, as sediment accreted in the flooded islands and shallow areas were established, wetland plant species would spread inward throughout the flooded islands. During this process, portions of the islands could be dredged to assist with the restoration through the establishment of nesting islands protected surrounded predator trenches.

Once established, the gate structures could be operated in such a manner as to strategically divert flows through the restored wetlands and maintain flow residence times sufficient to remove nutrients from fertilizers and provide other natural treatment processes offered by the wetlands. An operations plan would be developed to ensure appropriate salinity levels, maintain and capture sediment, and optimally manage nutrient levels that support the food web. This operational plan would be designed in consultation with State and Federal wetland biologists to mimic, to the extent feasible, the natural fluctuations in flow and water quality present in the historic Delta.

In subsequent years, if this process is successful, additional islands could be added to this group.

Conclusion

It is important to understand that fixing or further modifying the Delta will be an expensive and inexact process. There is no perfect way to fix the Delta - only some ways that will satisfy more needs for a longer duration than others. For every significant improvement made there will be an

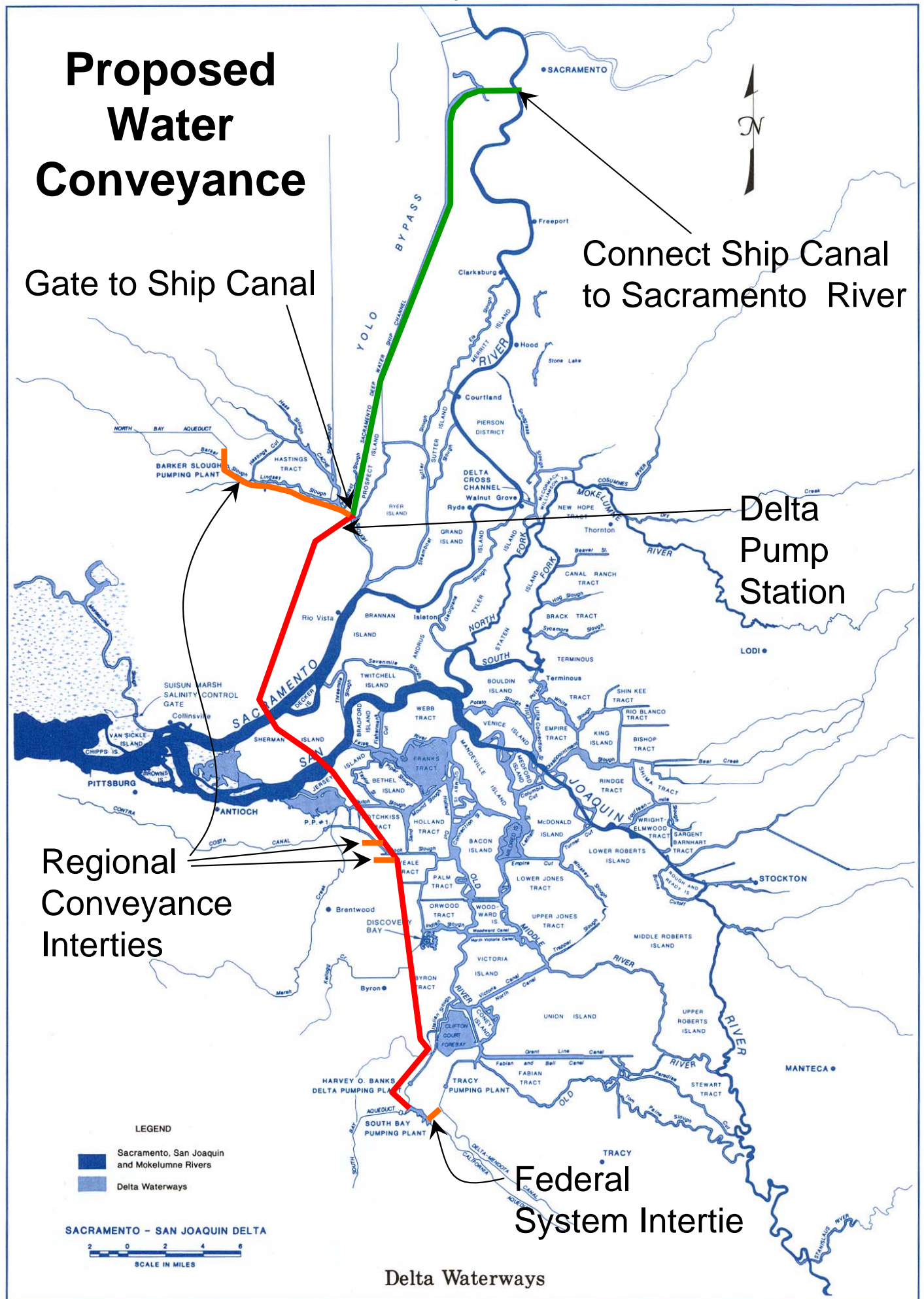
impairment or impact created as is the case whenever any highly altered natural system is moved out of a tenuous equilibrium that it has settled into. The problems in the Delta are incredibly significant in their scope and scale. Less expensive, minimal actions will yield benefits that are neither durable nor sustainable, and will ultimately prove to be inadequate in addressing the more serious problems confronting the Delta.

By far the most serious problem and the one that has the most significant impact to the State's economic health is the reliability of the supply of water flowing from north of the Delta to the export pumps. For many decades the strategy to move the water from where it is to where it is needed has relied on maintaining an artificial fresh water lake in portions of the Delta. This effort, and the resulting supply of water, has been largely responsible for the robust economy of the State and the many benefits to its citizens that this prosperity has brought. Indeed, water supply fuels the economy, and the economy provides the resources for broad ranging social benefits. However, the highly altered natural ecology of the Delta and its ability to yield exportable water is at an environmental tipping point, and the economy and the benefits it produces are now at great risk as the Delta moves toward failure and the once healthy ecology continues to crumble.

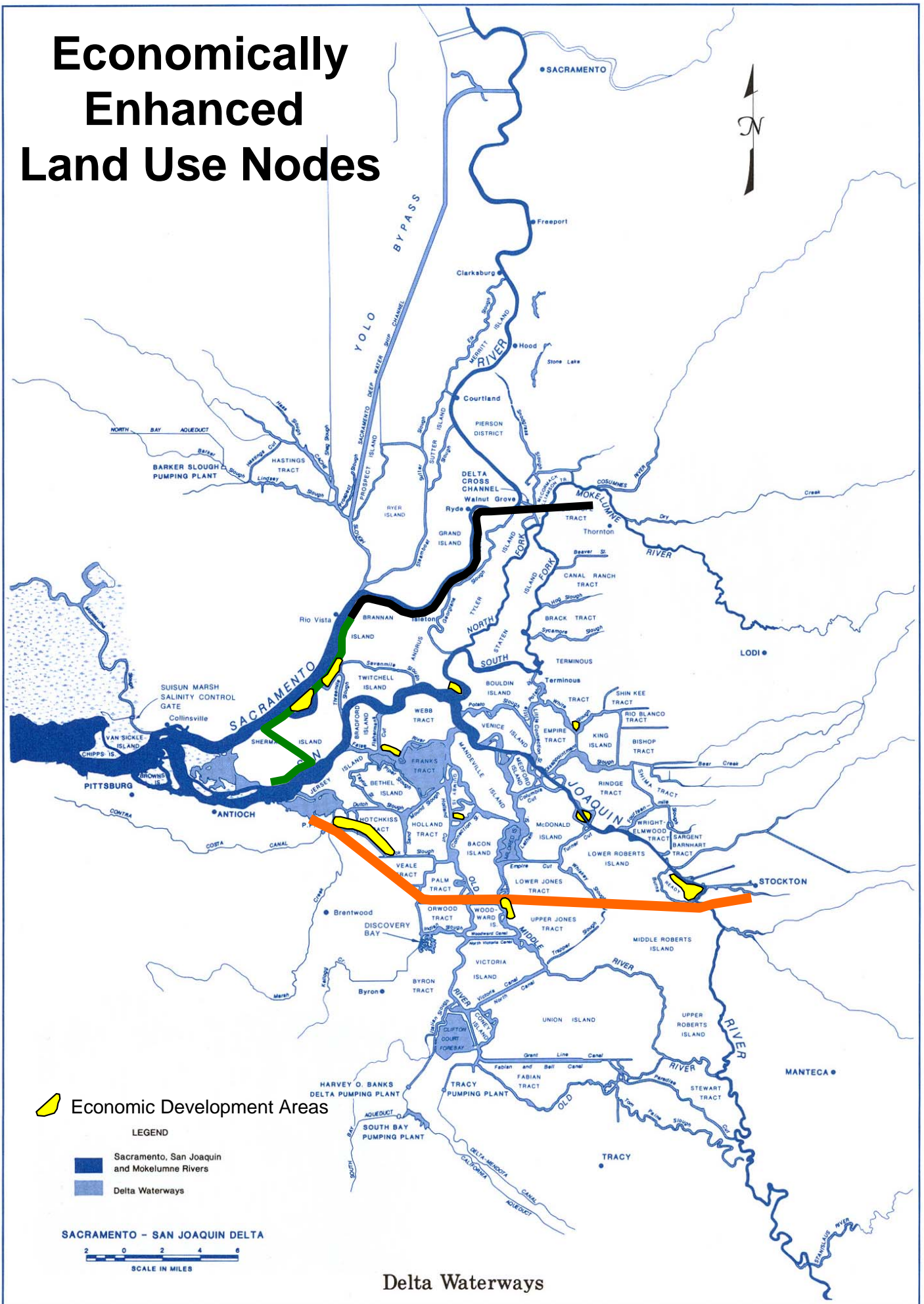
It is absolutely critical to take significant action because the worst of all situations is caused by doing nothing. Waiting for a catastrophic failure of the Delta could substantially limit the ability of the State to undertake a post-failure fix and may have the effect of permanently downgrading the quality of life in the entire State.

To develop a solution that successfully resolves the myriad of problems in the Delta is a task that has faced the citizens of the State of California for decades. The complexity and magnitude of the task is far more detailed than can be explored in this vision proposal. As such, this proposal offers a broad vision that is intended to facilitate discussion of what possible solutions may exist. It is acknowledged that substantial environmental review, biological assessment, engineering feasibility analyses, implementation planning and monitoring programs would need to be completed to confirm the viability of all or portions of this proposal. However, it is respectfully offered for consideration by the Delta Vision Blue Ribbon Task Force as an alternative vision that is intended to address the diverse needs of this unique resource area and the State.

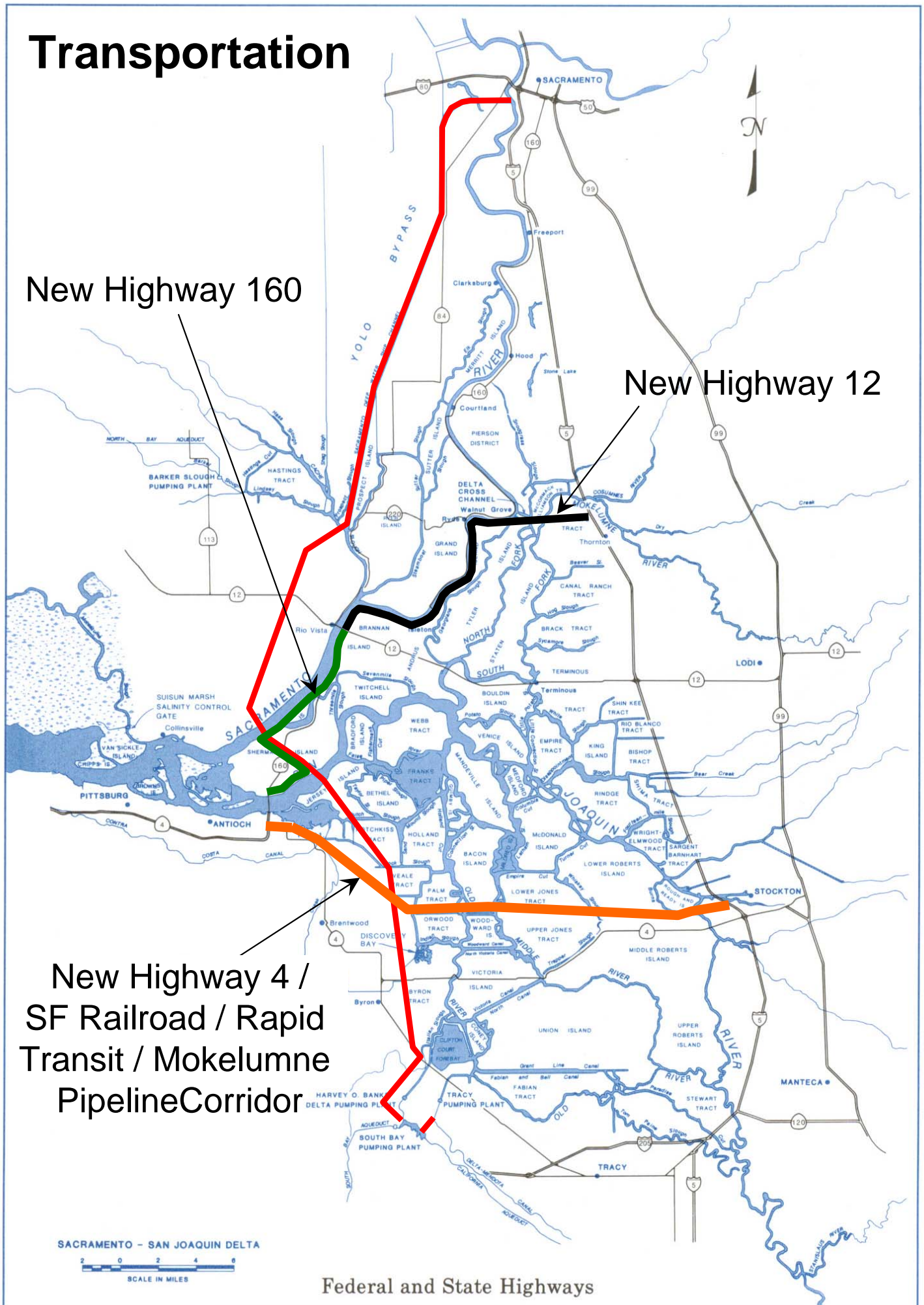
Exhibit "A"



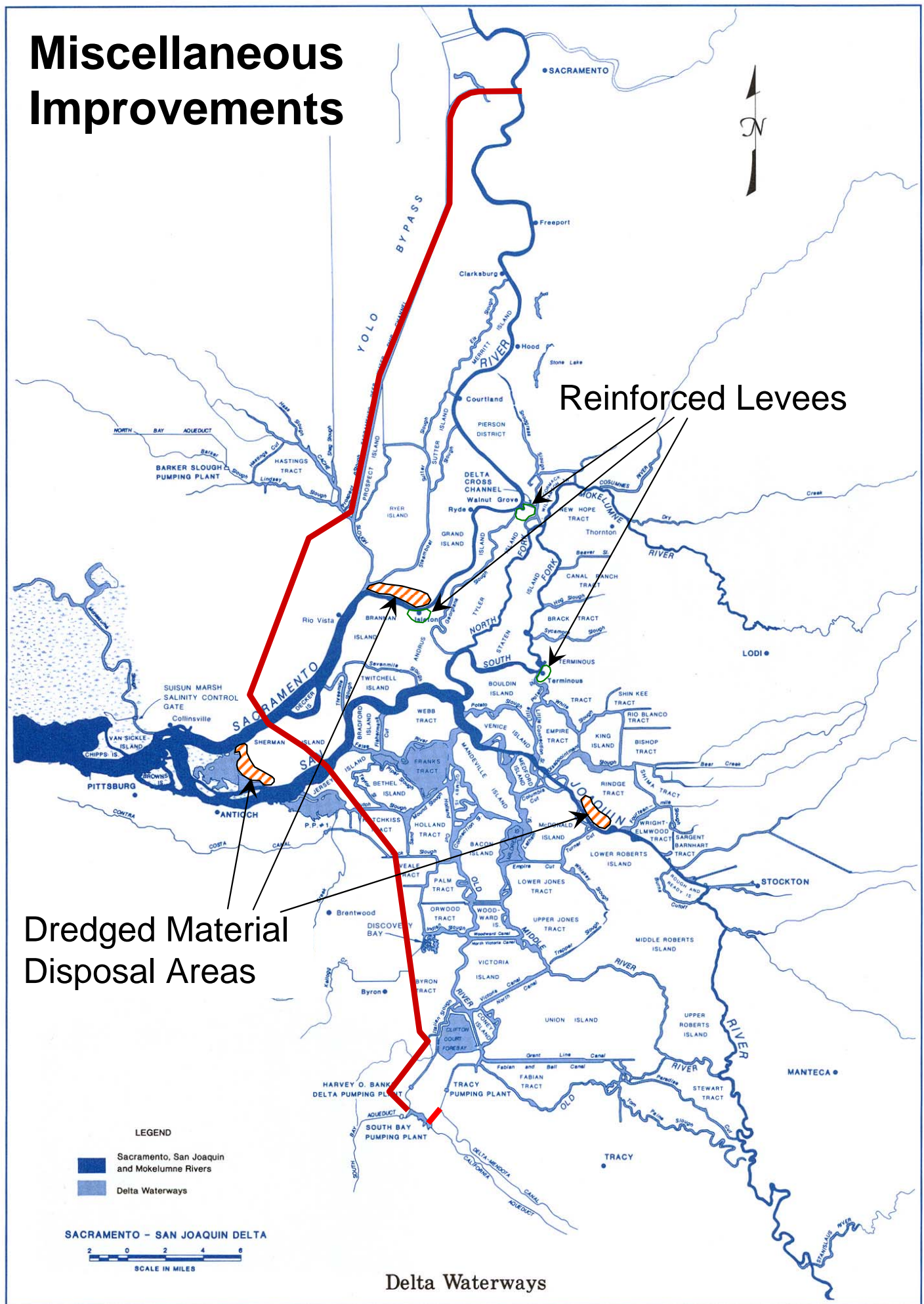
Economically Enhanced Land Use Nodes



Transportation



Miscellaneous Improvements



Restored Delta Islands

